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Salish Sea Ecosystem Conference

2014 Salish Sea Ecosystem Conference (Seattle, Wash.)

May 2nd, 10:30 AM - 12:00 PM

Monitoring the movements of a critical marine resource: tracking a forage fish in Puget Sound

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Monitoring the movements of a critical marine resource: tracking a forage fish in the Salish Sea

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Western Fisheries Research Center
Columbia River Research Laboratory

U.S. Department of the Interior
U.S. Geological Survey

Background

- Forage fish guild: Important marine resource
- WDFW 30 year dataset on spawning
  - Spawning beaches
  - Seasonal timing
- Large data gaps
  - Movement and distribution
  - Site fidelity
  - Feeding ecology

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Acoustic Telemetry

- **Powerful tool**
  - Monitor individual animals
  - Fine-scale movement information

- **But…..**
  - Requires a big assumption: limited tag effects
  - Best to have some baseline info to design monitoring

Our effort was a pilot study designed to:

1) Test fish handling & tag implantation procedures
2) Collect baseline data to inform future efforts

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Methods

- Vemco 69 kHz
  - V7 tags (73 d life)
  - Compatible with other deployed receivers
- Ross Pt in Sinclair Inlet
  - Well document spawning beach
  - Popular recreational fishing site
  - Dip netting with local fishers
- Tagged 12 males in Nov 2012
  - Mean size: 167 mm FL and 43 g
  - Mean tag burden 3.8%

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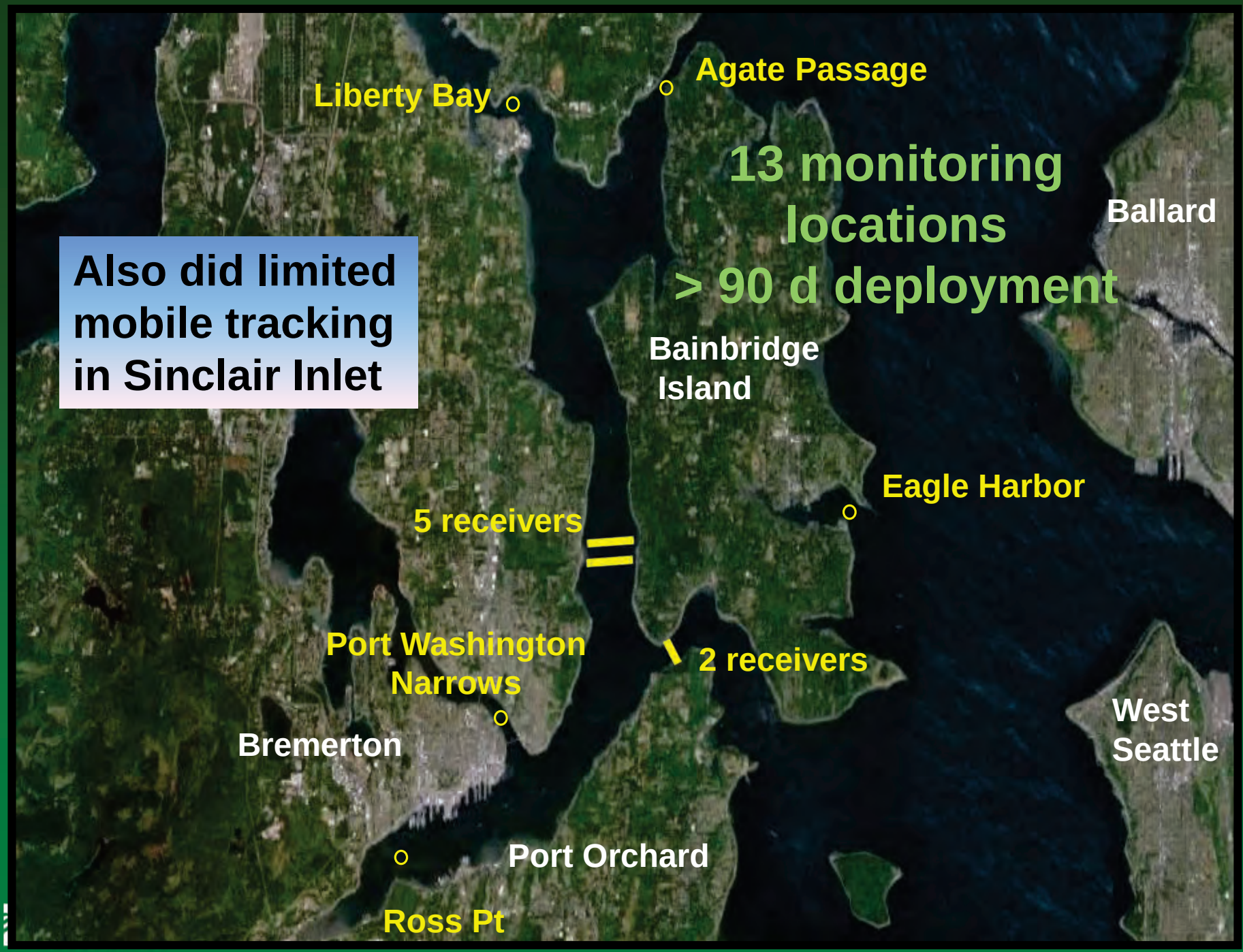
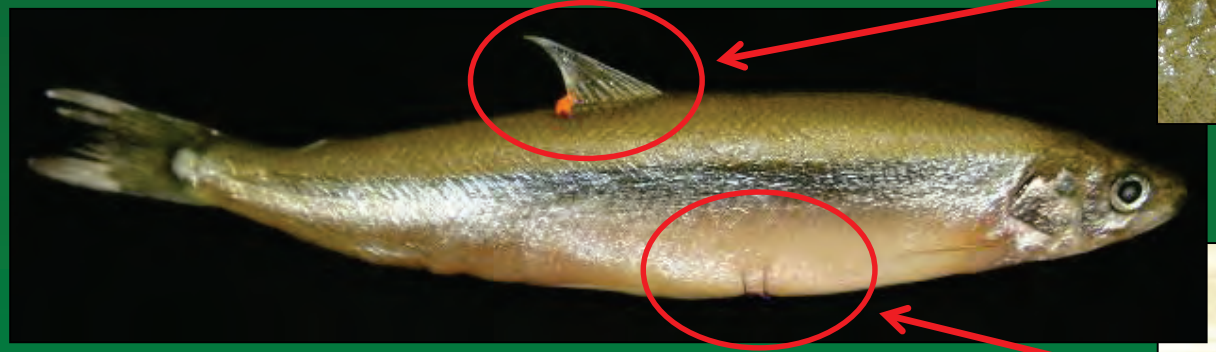

Liberty Bay
Agate Passage
13 monitoring locations
> 90 d deployment
Ballard
Also did limited mobile tracking in Sinclair Inlet
Bainbridge Island
Eagle Harbor
5 receivers
2 receivers
Port Washington Narrows
Bremerton
West Seattle
Port Orchard
Ross Pt

ATTENTION: SURF SMELT ANGLERS

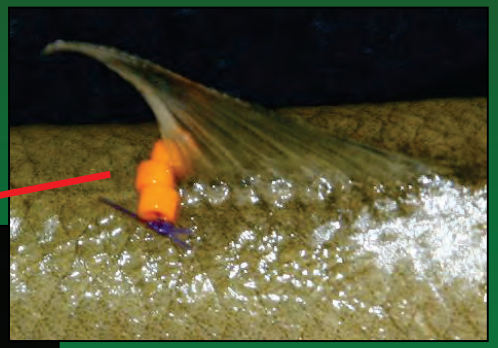
TAG REWARD

- Made fish visually distinct
  - Dorsal beads & ventral stitches
- Signs at all fishing access points
- Word of mouth

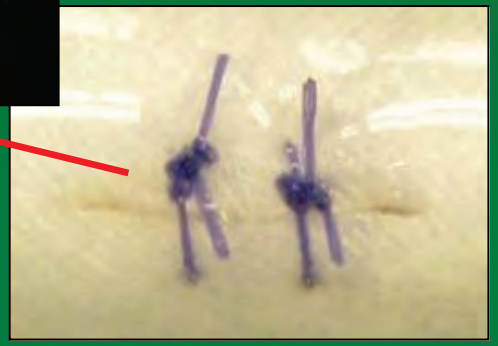
Transmitter



Beads



Stitches



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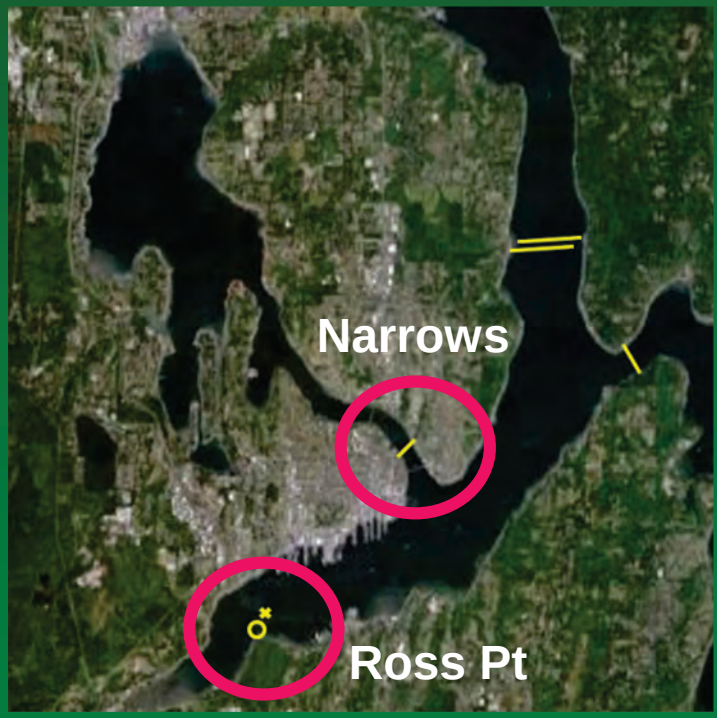
Results

- All fish detected within a few days of release
- Detections restricted to:
  - Ross Pt: all individuals
  - Port Washington Narrows: 1 individual

- Port Washington Narrows
  - Good detection across channel
  - Ross Pt for 6 d after release
  - Not detected again



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Ross Pt

- Station positioned to monitor the spawning beach
- Spawning beach across the Inlet
  - Not within range of Ross Pt station

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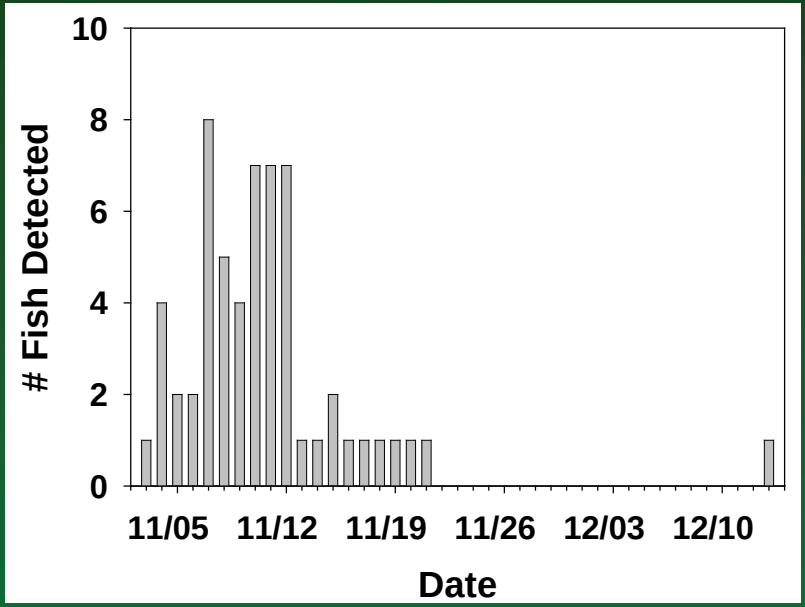
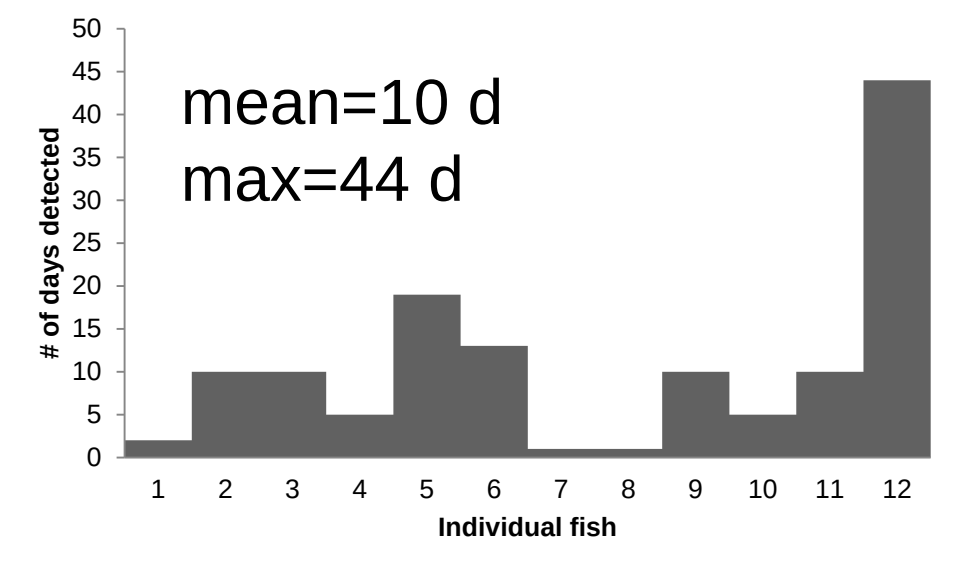
Ross Pt Results





- Average of 6 visits to the site (max 17)
- Residence time: 2.2 h (max 8 h)
- Lag time: 2.3 h (max 5 d)

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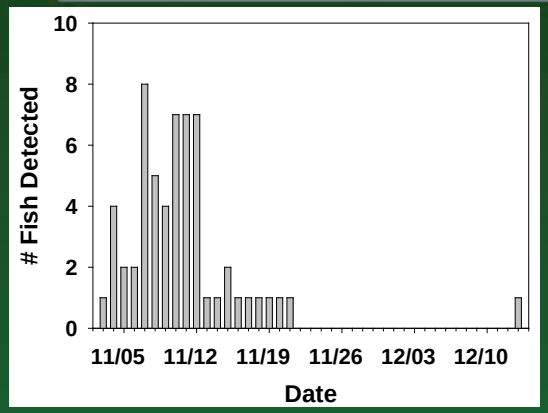
Where did they all go?



No longer at Ross Pt
Not detected elsewhere

- Possibilities:
  - Fish died
  - Left Sinclair Inlet without being detected
  - Within Sinclair Inlet but outside of detection range
    - Detections at spawning beach on opposite shoreline (mobile)
  - Captured by recreational or commercial fishers

1 reward issued
Large commercial effort

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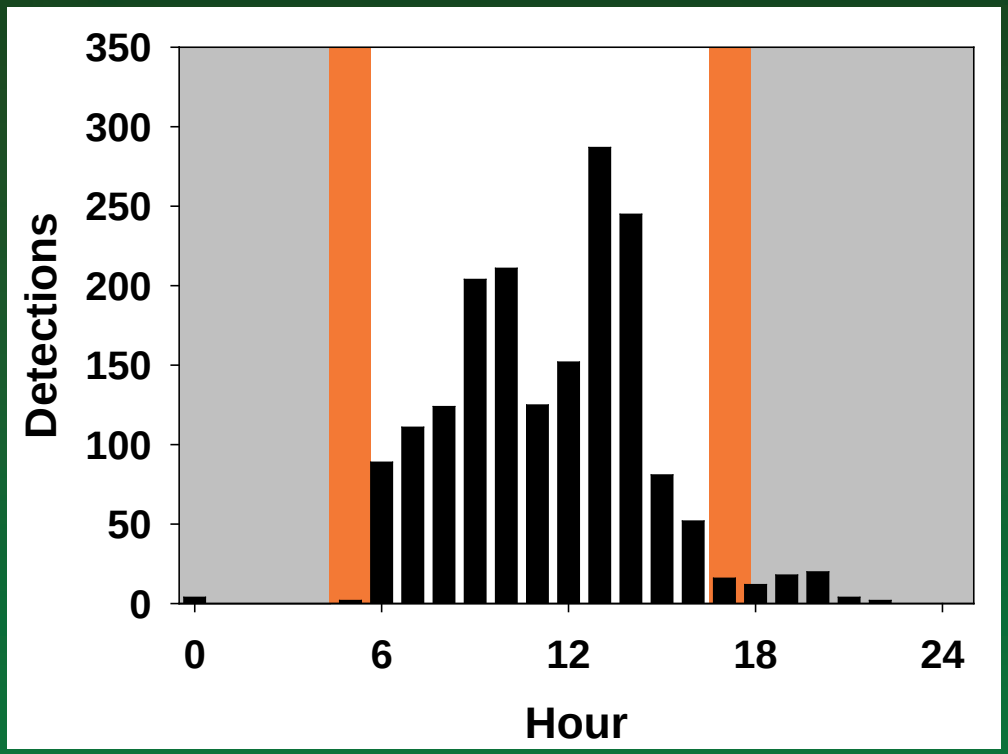
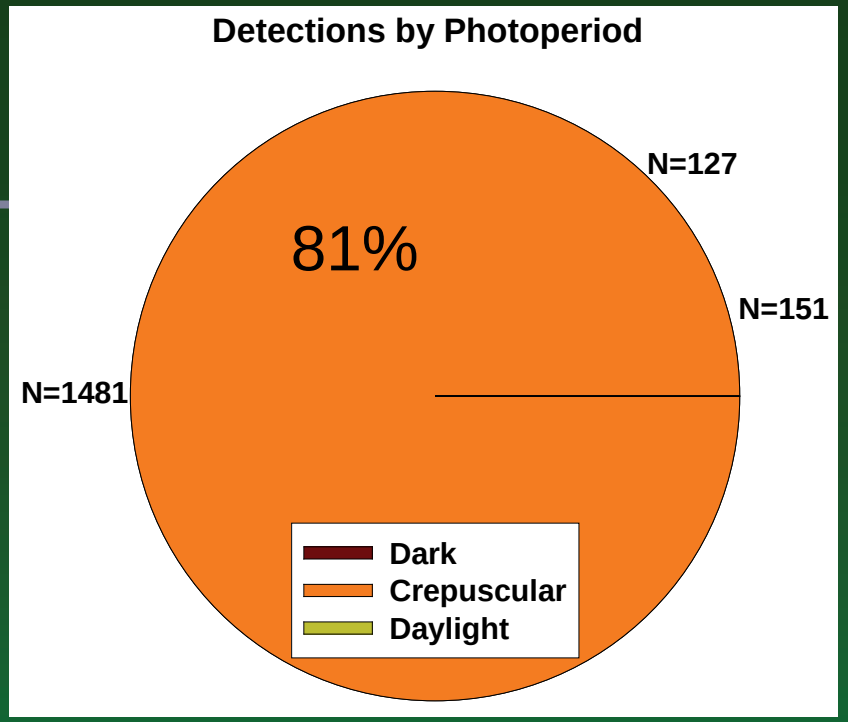
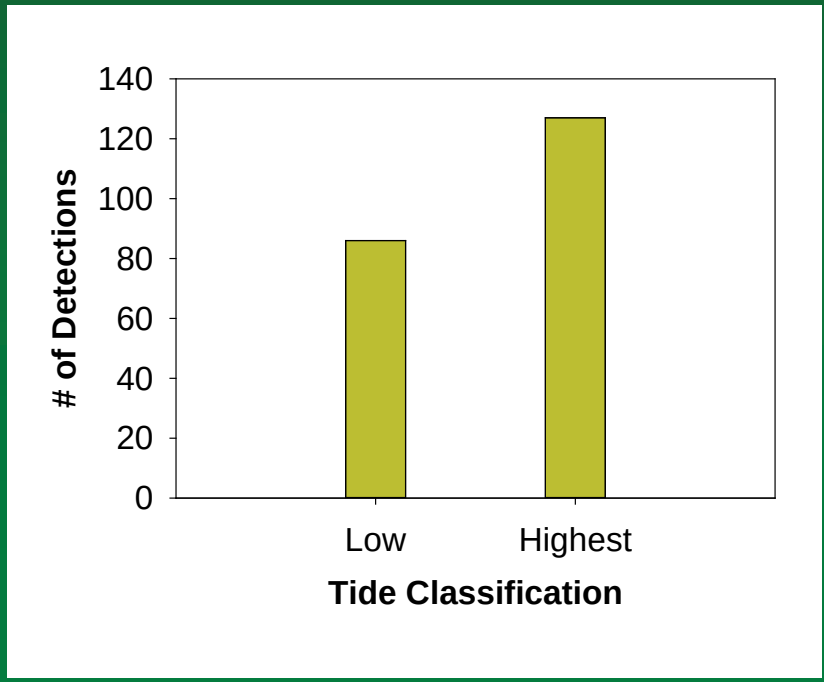
Ross Pt Detections







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Next Steps

- Full-scale effort in fall-winter of 2014-2015
  - Tag fish earlier in the season
  - Mix of males and females
- Focused monitoring in Sinclair Inlet
  - Head of the Inlet
  - Alternate spawning beach
  - Detailed movements around Ross Pt

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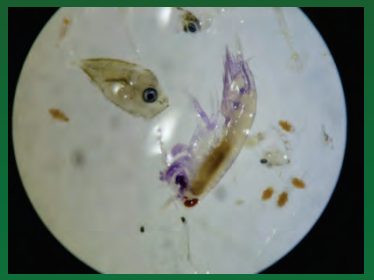
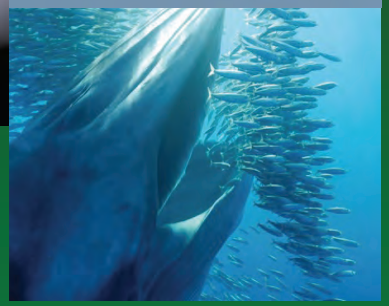
Study Context

- Part of a larger USGS program
  - Coastal Habitats in Puget Sound (CHIPS)
  - Interdisciplinary approach
- Address some of the forage fish data gaps
  - Focus on habitat
- Current research topics include:
  - Sand lance burrowing habitats
  - Habitat use & food habits of juvenile sand lance & surf smelt



Study Relevance

- Movement & phenololgy information useful for:
  - Modeling efforts
    - Climate impacts
    - Contaminant exposure risk
    - Trophic dynamics
      - Predator-prey interactions
      - Seabirds, salmon, marine mammals
  - Habitat protection & restoration
  - Resource management
    - Stock monitoring



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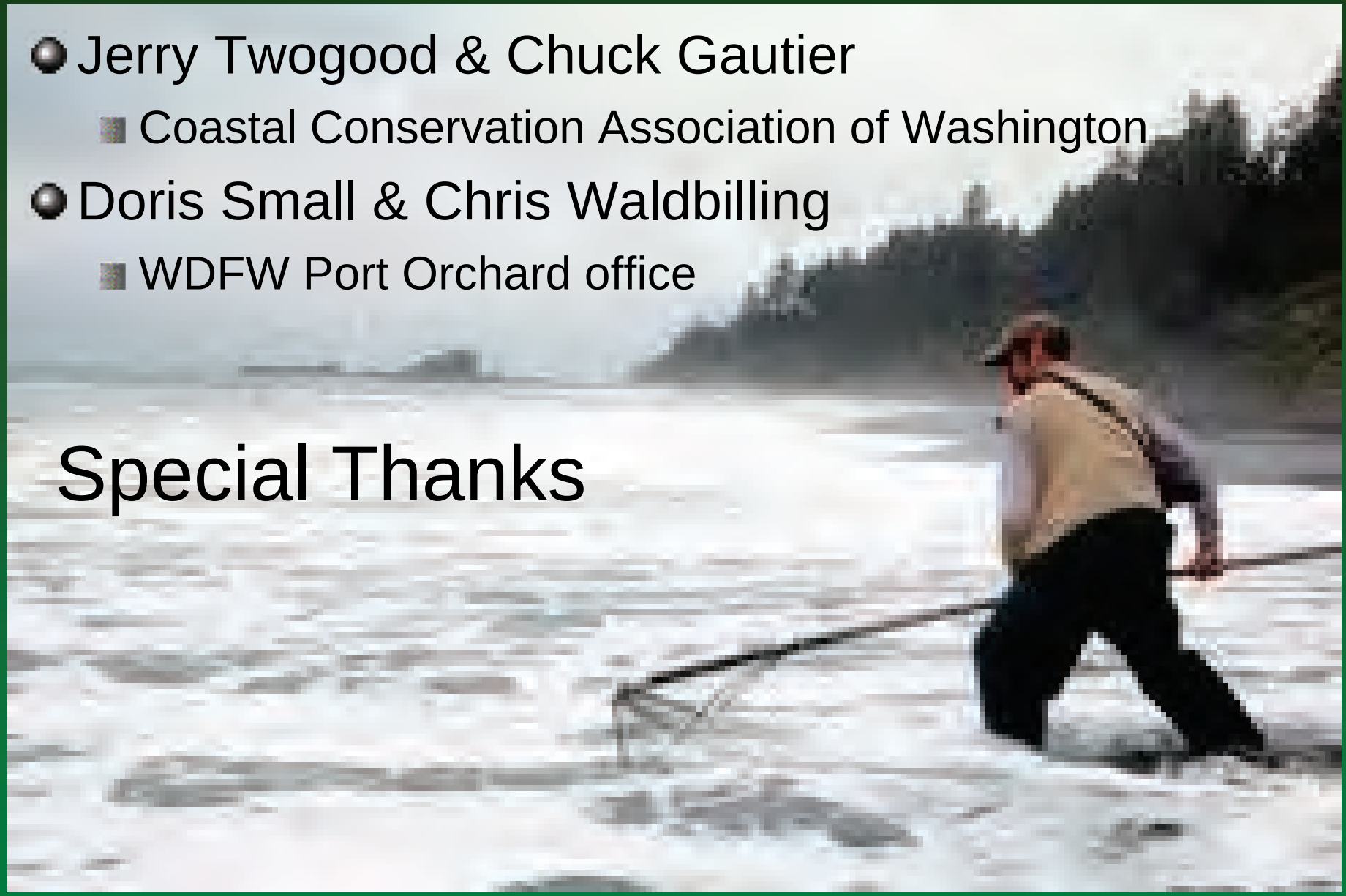

Special Thanks

- Jerry Twogood & Chuck Gautier
  - Coastal Conservation Association of Washington
- Doris Small & Chris Waldbilling
  - WDFW Port Orchard office

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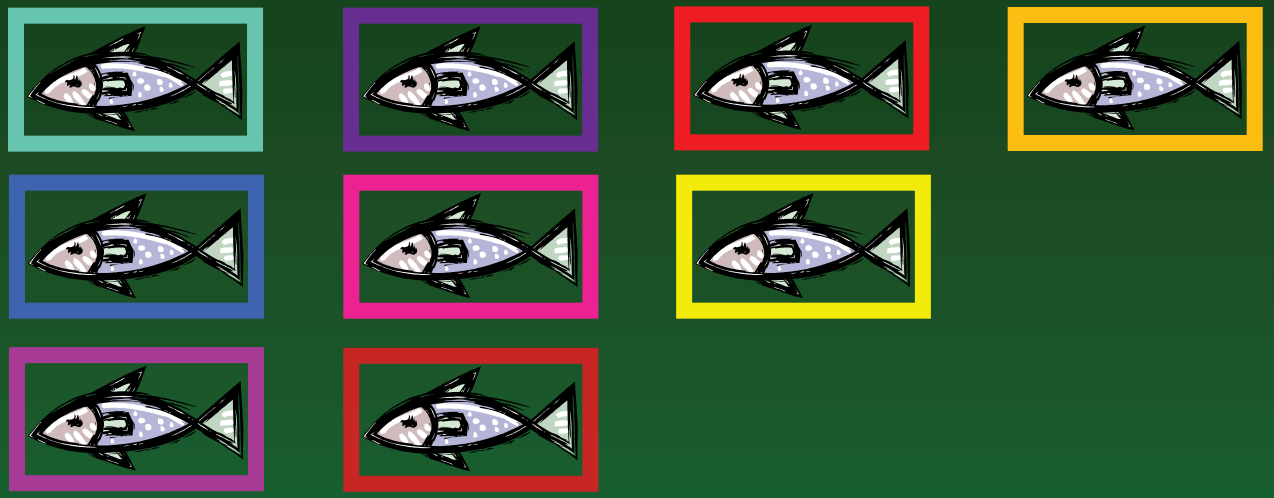
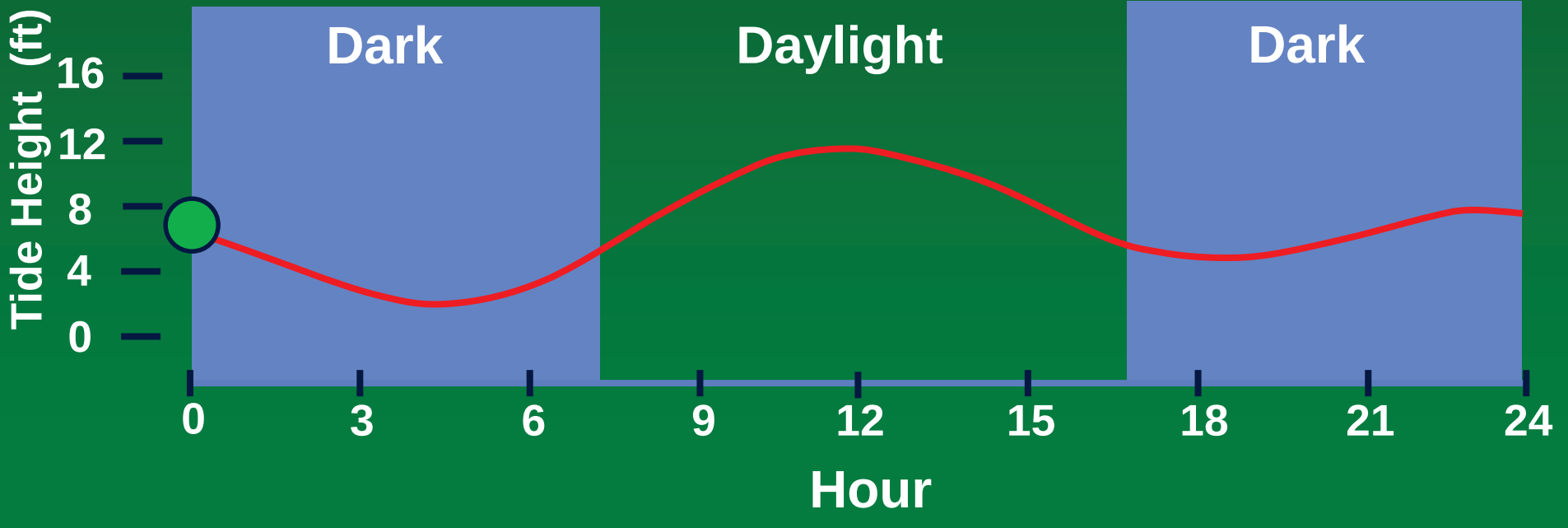
Questions?

November 7, 2012





Transmitter selection

- V7-2x-A69-1303
  - 73 day tag life
  - 45 second nominal pulse rate
  - 30-60 sec pulse rate range
  - 1.6g in air

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